

27.  $\int_0^\pi \sin x \, dx$

a) trap  $(0, \pi, 10)$

100  
1000

b) exact - trap  $\frac{n}{10} \mid .016$   
100  $\mid .000164$   
1000  $\mid .00000164$

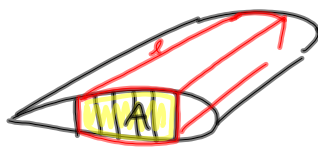
c) 2 more zeros each time

d)  $\frac{b-a}{12} \left( \frac{b-a}{n} \right)^2 m_4$   
 $\frac{\pi}{12} \left( \frac{\pi}{n} \right)^2 \cdot 1$

$n=10$   
 $n=100$   
 $n=1000$

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density =  $42 \frac{\text{lb}}{\text{ft}^3}$

weight = 500 lb

$d = \frac{w}{V}$

$V = \frac{w}{d} = \frac{500 \text{ lb}}{42 \frac{\text{lb}}{\text{ft}^3}}$

$V = A \cdot l$

$V \approx 11.9$

$V = 11.2 l$

$11.9 = 11.2 l$

$l = 10.63 \text{ ft}$

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ch 5

Integrals

definite  $\int_a^b f(x) \, dx$

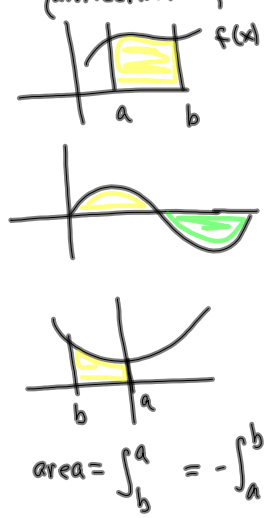
indefinite  $\int f(x) \, dx$   
(antiderivative)

area =  $\int_a^b f(x) \, dx$

area  $\neq \int_a^b f(x) \, dx$

area  $\neq \int_a^b f(x) \, dx$

$\int_a^b = -\text{area}$



area =  $\int_b^a = -\int_a^b$

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FTC

I  $\int_a^b f(x) \, dx = F(b) - F(a)$

$F(x) = \int f(x) \, dx$

II  $\frac{d}{dx} \int_a^x f(t) \, dt = f(x)$

I  $\int_a^b f'(x) \, dx = f(b) - f(a)$

$f(b) = \int_a^b f'(x) \, dx + f(a)$

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estimate  $\int_a^b f(x) dx$

LRAM  $(y_0 + y_1 + y_2 \dots y_{n-1}) \cdot \Delta x$   
 leave off last

RRAM  $(y_1 + y_2 \dots + y_n) \Delta x$   
 leave off first

MRAM  $(y_1 + y_3 + \dots + y_{n-1}) 2\Delta x$

TRAP  $\frac{h}{2} (y_0 + 2y_1 + 2y_2 \dots + y_n)$   
 $h = \Delta x$

\* if not even spacing,  
 do one shape at a time

1 trap:  $\frac{1}{2}(b_1 + b_2)h$

$x_0$	$y_0$
$x_1$	$y_1$
$x_2$	$y_2$
$x_3$	$y_3$
$\vdots$	$\vdots$
$x_n$	$y_n$

average value  
(mean)

$$\bar{y} = \frac{1}{b-a} \int_a^b f(x) dx$$

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